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Operational Fires: Maximizing Effectiveness

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The Contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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Introduction

Wars, to a greater extent than any other events in history, have been studied and analyzed to determine how they might have been accomplished more effectively. Today, officers in all levels of military education study battles dating back to the times of the Peloponnesians to ascertain what works and what does not. The strategies and tactics of winners and losers alike are scrutinized in great detail in an attempt to understand why the events of the past happened as they did.

Strategy and tactics alone, however, have proved insufficient in war. Military leaders are becoming increasingly aware of the importance of Operational Art. To “think” operationally, requires an in-depth understanding of the relationship between time, space, and forces. Operational art provides the framework¹ for commanders to determine the sequence of actions most likely to produce the military conditions necessary to achieve their strategic goal. Understanding the military conditions necessary to achieve the strategic goal enables a commander to correctly identify enemy centers of gravity, and establish reasonable and attainable operational objectives. This marks the critical first step in issuing the guidance necessary for the development of an effective campaign plan.

Thesis

Operational fires are an essential element of the Joint Force Commander’s campaign plan. The concept of operational fires, however, is not well understood by the majority of officers in the U.S. armed services. For this reason the subject of operational fires has become one of the most contentious issues in the U.S. military today. Joint doctrine further contributes to this lack of understanding by failing to provide a common definition around

which a conceptual framework can be established. As a result, the individual services have internalized their own, often divergent, views on operational fires. These views are heavily influenced by the domains in which each service operates, with the preponderance of dissention occurring between air and ground forces. Campaign design and planning, are not the sole purview of any one service. The challenge is to develop a system for planning and executing operational fires that works for the joint force as a whole, since military operations are becoming increasingly joint in nature..

During Desert Storm, the Joint Force Air Component Commander (JFACC) controlled the bulk of the assets capable of conducting operational fires and became the de facto authority for its planning and execution. While the success of the JFACC system to organize a unified air effort is widely acknowledged, the perception of its ability to manage an effective plan of operational fires has met with less enthusiasm.

Despite the obvious shortcomings revealed by Desert Storm (the first time the JFACC concept was utilized), the JFACC remains uniquely positioned to coordinate, plan, and execute the operational fires mission. Four issues, however, remain as obstacles to the effective execution of the operational fires mission by a JFACC. First, joint doctrine must be updated to include a concise definition of operational fires. Second, the JFACC must have access to sufficient joint force assets to conduct the operational fires mission. Third, the Air Tasking Order (ATO) process must become more responsive to the needs of the other component commanders, and finally, an effective command and control mechanism must be developed to provide both Army and air assets reasonable access to the Area of Operations located beyond the Fire Support Coordination Line (FSCL). A close examination of these

issues will reveal there is no need for additional layers of planning or oversight for the effective conduct of operational fires within a theater. The JFACC system, with a few minor improvements, will assure unity of both the air effort and the overall joint operational fires strategy.

Operational Fires -- Not Just Semantics!

Fires may be conducted at the strategic, operational, or tactical levels of war, and they may be lethal or nonlethal. *Lethal* fires are designed to delay, disrupt, destroy or degrade enemy forces, or critical functions and facilities through the employment of weapons on targets such as enemy ports, bridges, command and control facilities.² *Nonlethal* fires are intended to impair, disrupt or delay enemy forces, functions and facilities through the employment of nonlethal assets such as electronic warfare and psychological operations.³

Fires are considered *operational* when they have a decisive impact on the conduct of a major operation or campaign by:

- Isolating the theater or area of operations
- Restricting enemy freedom of movement
- Facilitating friendly maneuver
- Preventing or disrupting enemy freedom of maneuver
- Preventing the arrival of enemy reinforcements into the theater
- Destroying or neutralizing enemy reserves and facilities
- Deceiving the enemy as to the sector or main effort or point of main attack⁴

Operational fires differ from *tactical fires* in that they are integral to the JFC's overall campaign plan and establish conditions favorable for future operations; they are planned, approved, and passed down to tactical units for execution. Tactical fires, on the other hand, typically originate at the tactical unit level with a fire support request. Although tactical fires may produce results of operational significance they remain tactical nevertheless.

Operational fires are synchronized in time and space to directly contribute to the accomplishment of a major operation or campaign.⁵

Operational and *tactical fires* are complimentary in nature and can produce a synergistic effect when used in concert with increased operational tempo. While *operational fires* are directed at restricting the enemy's access to outside resources, *tactical fires* and other operations within an area of operations (AO) cause the enemy to expend resources at an unsustainable rate, magnifying the effects of operational fires, hastening the need for outside resources and possibly the arrival of his culmination point.

"Operation Strangle," in Italy, provides an excellent example of the synergy that can result from using operational fires in concert with increased operational tempo. In March 1944, American aircraft mounted an intense air effort aimed at shutting down the transportation network that was supplying the German Gustav Line, where the Allied forces had been stalled for several months. Despite the highly effective air offensive, which cut the German rail capacity from 80,000 tons per day to 4,000 tons per day (well below what the Germans needed to resist an intense offensive) the German army was not forced to withdraw.⁶ The German army could sustain very low intensity combat on 4,000 tons per day, but once the allies began the ground offensive, a breakthrough occurred very quickly.

Fires, both lethal and nonlethal, can be conducted by any component of a joint force and by any weapon system capable of reaching into the enemy's operational depth. They may be conducted in either a maritime or ground AO. In a theater where ground operations are predominant, fires can be conducted by land or sea-based air, helicopters, long-range missiles and artillery. Special operations forces may also provide valuable support to the fires

missions when targets are inaccessible by other methods, or where clandestine operations are required. Where adequate facilities are available to support them, however, the task of conducting *operational fires* has become almost the exclusive domain of air power.

The same inherent characteristics that make aircraft suitable for all levels of war, and against virtually all types of targets, make them ideally suited to conduct operational fires. Their speed, range, flexibility and precision weapons capability, coupled with the ability to operate from widely dispersed airfields and aircraft carriers, enables aircraft to strike targets of operational and strategic significance with a high probability of success and with minimal risk of friendly casualties or collateral damage.

In the *operational fires role*, air and space assets offer the JFC a broad spectrum of *lethal* and *non-lethal* capabilities. By employing *lethal fires*, air power can establish aerospace control, facilitating friendly maneuver unimpeded by attack from enemy air forces. Air power can also isolate a theater or area of operations by interdicting troops and supplies in the enemy's operational depth, well before they can be brought to bear on friendly forces. By conducting high-tempo operations in one area, air power can contribute to an overall scheme to deceive an enemy as to the next sector or point of main effort. In a *nonlethal* role, air and space assets can have a significant impact on current or future operations by conducting operations aimed at reducing an adversary's will to fight and denying or degrading his ability to effectively command and control his forces.

The same strengths that allow air power to conduct operational level fires and attack effectively at the enemy's operational depth also make it extremely valuable at the tactical level of war. When used in conjunction with ground forces, air power can enhance maneuver

and create opportunities for decisive action. Although air power can provide a ground commander with increased leverage on the tactical battlefield, the influence will be short-lived and seldom felt beyond the immediate area. Air assets are finite and will seldom be sufficient to cover every request. The JFC must, therefore, remain alert for signs that air power is being diverted or applied piecemeal to achieve subsidiary results at the expense of the primary objective.

To promote better understanding of operational fire concepts, it will be important for joint doctrine to establish a clear, overarching definition of operational fires. A *pro tem* definition of operational fires is: *lethal or nonlethal effects planned as an integral portion of an operational commander's campaign strategy to have a significant effect on the conduct of a campaign or major operation, establish conditions necessary for future operations, or cause an adversary to significantly alter his campaign strategy by: degrading, denying, or destroying enemy critical functions, facilities, or forces before they can be brought to bear on friendly forces.* Whether conducted prior to the beginning of a major operation, or as the prelude to opening a new campaign, *operational fires* provide the JFC an effective method of leveraging his assets by striking directly at the enemy's operational depth. For this reason, they must be carefully planned, coordinated, and executed by a commander with a firm grasp of the operational level of war.

Service philosophy

U.S. Army

Classic ground warfare has typically involved the mobilization and deployment of forces in depth, to engage an adversary on the periphery of his territory and then incrementally,

through a series of battles penetrate to the interior until he is either decisively defeated or the objective is secured. This *outside-in approach* is generally characteristic of armies even today.

New technology had expanded the Army Corps commander's capabilities to look deep into the battlefield and identify enemy targets, and an Army Corps commander was not concerned with the entire theater. He looked at the battlefield like a giant bowling alley. To move down the lane, the corps needed to sweep the obstacles from its path, starting with those directly in front of it, and then those a day or two away.⁷

Operational maneuver is the means by which combat power is concentrated at the critical point to achieve the surprise, shock, momentum, and dominance that enable smaller forces to defeat larger ones.⁸ Fires (not fire support) conducted in support of this maneuver are considered, by the Army, to be *operational fires*.⁹ Restricted to maneuver in only two dimensions by their need to move infantry and armor, the Army's perspective on war is understandably geographic in nature. Ground combat operations, by-and-large, require an army to traverse enemy terrain and dispose of multiple layers of corresponding enemy forces enroute to their ultimate objective. Terrain, both natural and man-made, significantly influences the mobility and sustainability of ground forces.¹⁰ Clausewitz addresses the significance of terrain to the Army in, *On War*.

"Geography and ground can affect military operations in three ways: as an aid and obstacle to the approach, as an impediment to visibility, and as cover from fire."¹¹

The success, or failure, of an army is largely a factor of its ability to overcome geographically oriented obstacles. Boundaries play an important role in ground combat operations. In order to organize and orchestrate the movements of large forces, commanders divide their battlespace into manageable blocks. These blocks of battlespace delineate *deep*,

close and *rear* operations:¹² The *deep battle area* is where the army attempts to attack the enemy's operational depth, delaying, disrupting and destroying his forces and critical functions, thereby degrading an enemy's ability to maneuver and employ his forces. The *close battle area* is where the main and supporting forces maneuver around or through enemy defenses to occupy objectives that permit the defeat of the defending forces. Subordinate commanders further subdivide their areas to delineate responsibilities for zones of action or sectors of defense, to coordinate fires, and to direct *maneuver*.¹³ The *rear battle area* contains those combat service and staff functions necessary to sustain combat operations and support the force.

USAF

Ground combat operations have the best chance of success when they are synchronized with air superiority and air interdiction operations.¹⁴ While air power can be a decisive factor in support of ground maneuver it can do a whole lot more. The ability to maneuver in three dimensions leaves airmen with a decidedly *boundless orientation*. Theaters of war, theaters of operations and areas of operations constitute one large seamless whole bounded only by the earth below. Air power visionary Billy Mitchell spoke of the aircraft's unique ability to transcend geographic barriers in the opening chapter of his book, *Winged Defense*.

The air covers the whole world, aircraft are able to go anywhere on the planet. They are not dependent on the water as a means of sustenance, nor on the land, to keep them up. Mountains, deserts, oceans, rivers, and forests offer no obstacles...the whole country now becomes the frontier and, in the case of war, one place is just as exposed to attack as another place¹⁵

It was this element, Mitchell believed, that would profoundly change the nature of war. Although air power has obviously not changed the *nature* of war, it has changed the way

warfare is waged.¹⁶ Air power has altered the time-space relationship making war a nearly instantaneous affair and giving it a sense of immediacy that did not previously exist.

Since all points on the surface of the earth are now vulnerable, a commander has the ability to strike all facets of an enemy's structure. Air power increases the opportunities to create problems for an enemy and create favorable circumstances for friendly forces. For air power planners, the theater's dimensional aspects are only of consequence when operating in support of ground forces. To aviators, the theater looks more like a giant dart board with the enemy's command, control, communications, and decision-making capability as its bull's-eye.¹⁷ Again, this perception of the value of air power to a campaign was expressed by Mitchell.

"No longer will the tedious and expensive process of wearing down the enemy's land forces by continuous attacks be resorted to. The air forces will strike immediately at the enemy's manufacturing and food centers, railways, bridges, canals, and harbors. The saving of lives, manpower, and expenditures will be tremendous for the winning side."¹⁸

The success of the "air campaign" in Desert Storm validated the *inside-out approach*. It initially bypassed the troops in the field in favor of an intensive air effort aimed at targets of strategic and operational significance.

There is no universal formula for the application of Air power, but there are many factors that will impact the decision. The level of the air effort and resources dedicated to particular missions is highly dependent on factors such as, the state of the forces, phase of the plan, and the nature of subsequent operations. When the situation permits, air power is best used in pursuit of operational or strategic level objectives. Although air assets can prove decisive in supporting the tactical battle on the ground, operations conducted in parallel (complimentary, but independent of the the campaign itself) often provide the best reward. Leveraging air

power by conducting a coordinated effort focused on a persistent and well planned program of operational fires provides a synergy that cannot be attained on the tactical battlefield. The most important contribution an Air Component Commander (ACC) can make is to assure air power remains focused on the primary objective set down by the JFC.

Assigning Responsibility for the Conduct of Operational Fires

The JFC has overall responsibility for the conduct of operational fires within his assigned theater. Since operational fires are necessarily conducted outside of a theater or area of operations, the bulk of these missions are performed by land or sea-based aircraft, and long range missiles.¹⁹ If the duration and intensity of operations is expected to last past the preplanned stage, or if the bulk of the capability needed to directly attack the adversary's center of gravity will require the extensive use of air assets, a JFACC will usually be selected based on the service with the preponderance of air assets in the theater capable of supporting the JFC's campaign.²⁰

The JFACC's most important task is integrating and orienting all of the theater air assets into a focused air effort committed to the JFC's operational and strategic objectives. Gaining aerospace control is usually the JFACC's first priority.²¹ The need to establish air superiority early is paramount. Air superiority is not only an enabler, it is a prerequisite to conducting all other air operations in the theater. It allows air, land and sea forces the freedom to maneuver and carry out other missions without interference from enemy air forces.

Once air superiority has been accomplished air forces can shift their focus to the support of other operations. A key function of the JFACC is to establish priorities. The demand for air assets will normally far exceed its capability. *Operational fires* leverage the power of air

forces by isolating the enemy and creating conditions favorable for future operations or campaigns. Close coordination with the JFC and the component commanders is required to efficiently apply air assets toward this cause. JFACC missions supporting *lethal operational fires* may include striking key command and control facilities, railheads, bridges and roads where enemy forces may be marshaling for transportation, suppressing enemy air defenses, and interdicting troops or supplies bound for the theater or area of operations. Non-lethal operational fires missions include electronic combat and PSYOPS.

Desert Storm provided the first real-world test of the JFACC system and provided a host of lessons learned for future campaign planners. The JFACC concept was developed to prevent the lack of unity of effort experienced in the air over Viet Nam;²² however, the individual service components remain reluctant to contribute forces to a pool over which they have no control. The current JFACC system fosters this reluctance by not delineating, prior to conflicts, those forces which will be exempt from the JFACC allocation process. In Desert Storm, the Marines reluctantly agreed to make available their A-6E bombers, EA-6B jammers and half of their F-18s but, only after they were assured that no requests would be made for their AV-8B Harriers and were guaranteed the support of USAF B-52s and A-10s.²³ Despite the success of those "handshakes," the Navy and the Marines remain concerned that these type of arrangements could result in a lack of support for their own forces (while their assets are tied up conducting other missions such as operational fires). From a JFACC perspective these arrangements will necessarily be ad hoc, and are highly dependent on the circumstances in the theater. Certainly, precautions must be taken to assure the safety of ground forces. The JFACC's responsibility, however, is to maximize the effectiveness of air

power as a whole. The JFC will have many requirements competing for his limited air assets. If individual components are exempted from the JFACC sortie allocation process the potential of air power as a whole is diluted. In order to assure that all air assets remain focused on the JFC's ultimate objective they must be synchronized and integrated into the overall air effort.

Planning

The JFC's Concept of Operations (CONOPS) forms the basis for the JFACC planning effort. The JFACC's air apportionment recommendation is based on the current phase of the campaign or operation, the current situation, or on establishing conditions for follow-on phase if required. The inputs from the individual component commanders are critical to establishing the priorities on which the JFACC bases his apportionment recommendation. Missions such as *operational fires* require a great deal of planning to be properly sequenced into a campaign. Before a coherent plan for operational fires can begin, however, several facts need to be established; appropriate targets must be identified, the correct number and mix of forces must be established, and an estimate must be made concerning the time required to produce the desired effect. Once the duration and targets are established planners can work backwards from the established D-day to when the operational fires need to begin.

The operational fires mission is also influenced by the need to balance the requirements across the entire theater. The need to maintain air superiority, support other operations, and to respond to unforeseen events (like the Scud hunting missions in Desert Storm) will all compete for priority. Therefore, the number of forces and sorties under the direct control of the JFACC will greatly effect the planning of operational fires. If assets are exempt or

withheld from the JFACC, the length of time necessary to conduct key missions such as operational fires will be unnecessarily extended. It is imperative, therefore, that component commanders recognize this and effectively communicate their plans to the JFACC well in advance.

The importance of effective and proactive liaison units as well as direct lateral communication between component commanders cannot be overstated. Committing to operations with long-lead times, like operational fires, reduces the sorties available for lower priority operations. It also limits the flexibility of the ATO process to respond to last minute requests for tactical assets. The 72-hour ATO process is necessarily short to ensure that the remaining assets are assigned to the highest priority targets. Service component liaison elements assure that high priority, time sensitive missions necessary to their operations are not overlooked.

Despite the friction that may occur over the lack of a joint planning cell completely external to the JFACC system, the fact remains, that the JFACC is uniquely positioned to know how, and where, the application of air power can have the most effect. Longer-range scheduling and apportionment decisions (with multiple decision and approval authorities) may provide a more stable and amicable relationship between the service components, but their utility is more than offset by the loss of flexibility and capability to react to fleeting opportunities. The unique flexibility and agility of air power demands a centralized top-down approach to assure focus is maintained on the operational level objectives. The JFACC apportionment and planning process operates on a short-range schedule in order to maximize the ability to seize opportunities as they arise. Increasing the ability to interact through

robust planning staffs and proactive liaison elements will allow the JFACC system to better respond to the needs of the other component commanders.

Command and Control

The JFACC is responsible for assembling a command, control, communications and intelligence system that allows him to accomplish JFC objectives.²⁴ His primary means of executing this task is through the Theater Air Control System (TACS). The purpose of this system is twofold: to assure effectiveness of force application assets, and to reduce the possibility of fratricide through deconfliction. Through TACS the JFACC exercises command and control over all of the airspace beyond the FSCL. Those operations conducted between the Forward Line of Troops (FLOT) and the FSCL, however, are controlled by the corresponding Corps commanders through Forward Air Controllers (FACs).

Deconfliction, particularly in the area within the AO but beyond the FSCL, has become a major source of contention for both the Air Force and the Army. While this regime does not appear to fit neatly into the category of *operational fires* there may be circumstances where that label may fit. *Operational maneuver*, is the means by which the Army employs large units to achieve their operational objectives. The Army considers, fires to be operational if they are designed to produce decisive gaps in the enemy defenses; by delaying, disrupting or limiting enemy maneuver in the deep-battle area (regardless of their location). This is the genesis of the operational fires and Army Tactical Missile System (ATACMS) coordination argument. The issue is much bigger than just ATACMS, however. Technological improvements in military equipment are increasingly coming into conflict with the established means of controlling and deconflicting them.

Command and Control is being impacted by technology in two ways. First, the Army now has weapons that can effectively engage targets well beyond the FSCL (ATACMS) which require time critical coordination with the JFACC's Air Operations Center to assure deconfliction before they can be employed. Second, modern tanks, helicopters, and other weapons systems have a remarkable degree of speed and mobility, causing frequent relocation of the FSCL. For airmen a fast moving FSCL means an interdiction target located in the deep battle area at takeoff may be inside the FSCL by the time they arrive on-station. Extending the depth of the FSCL is not the solution, however. The FSCL must remain limited to a distance that can be effectively reached by the main elements of the army's artillery.²⁵ The correct solution is to create a new division of the battlespace, a cooperative engagement zone (CEZ), located beyond the FSCL.

Prior to the issue of the most recent AFM 1-1, the USAF had included a fourth mission under Force Application--Battlefield Air Interdiction (BAI). BAI was designed to support friendly ground maneuver by operating beyond the FSCL; attacking key elements of the enemy's command and control, and attriting their operational and tactical reserves. By reviving BAI and creating a cooperative command and control system, aircraft will operate without the constraint of coming under the direct control of the Army and the Army would have greater flexibility in employing its long range weapons such as ATACMS.

To be effective this CEZ requires an intermediate control party capable of "monitoring" the forces within its area. This amounts to nothing more than someone aboard the Airborne Command and Control Center (ABCCC), or in the Corps headquarters rear area to monitor a radio.²⁶

Conclusions and Recommendations

Since the end of the cold war the U.S. armed forces have undergone one of the most dramatic reorganizations in history. Declining defense budgets have resulted in force structure cuts that approach fifty percent in many cases. With this smaller, leaner force, there is no room for the duplication of effort or redundancy of systems the services have enjoyed in the past. We must think and operate jointly; by law, and out of necessity. Thinking, and operating jointly in a peacetime environment does not necessarily translate to the ability to fight jointly, however. Before service components can fight jointly they will have to discard many of their old paradigms and much of their individual doctrine in favor of a new joint doctrine where each service is an equal partner with an equal stake. The military has come a long way toward establishing a sound framework around which a joint doctrine can evolve, however, a void remains with respect to terminology, like *operational fires*. This lack of consensus on terminology forces the individual service components to retain many of their old paradigms in order to fill the void. Much of the debate raging today between the U.S. Army and the U.S. Air Force is a direct result of the lack of consensus on terminology.

Smaller force structure demands that services find innovative new ways to accomplish their missions. Changes cannot be made in a vacuum, however. Service roles and missions represent a fine balance, changes in one will impact the other. The JFACC system that was used in Desert Storm is a perfect example of an innovation designed to leverage the capabilities of a smaller joint force. Although the JFACC system proved to be an effective means to overcome the unity of effort problems experienced in the air over Viet Nam, adjustments must be made to improve its responsiveness to ground forces.

Desert Storm proved the JFACC concept to be valid. To improve its effectiveness in the future, however, individual services will have to discard their suspicions and embrace the concept for what it is; a joint team of knowledgeable airmen working together with the ground and maritime components in a unified effort to apply air power in the most efficient and effective way possible toward the achievement of the overall joint force objective. Improving trust, by expanding the interface between the services, through wider use of liaison elements and increased coordination between the component commanders is the first step. Coordinating and executing effective missions, such as operational fires, requires close coordination and cooperation between component commanders, as well. If commanders can agree on definitions and overall campaign priorities, the chance of diluting the overall effectiveness of air power diminishes, by ensuring that it will not be applied piecemeal to tasks subsidiary to the primary objective. A refined ATO process is the vehicle that will help commanders remain focused on the objective.

Improvements in technology will continue to bring challenges to commanders with respect to the command and control of operational fires. New technology is increasingly allowing ground forces a degree of reach and mobility never before realized. A method must be devised to leverage this new flexibility, and to maneuver and employ these new weapons more efficiently in support of the theater objectives. By establishing a new cooperative engagement zone beyond the FSCL, air and ground forces alike can operate continuously without unnecessary layers of additional command and control, and without sacrificing the safety of our forces.

Operational fires represent a critical component of the JFC's theater campaign. They must be planned, coordinated, synchronized, and executed by a joint force that is both unified in purpose and in action. Establishing unity of purpose is well underway, but before the services can achieve true unity of action they first must understand each other. The first step is to develop a common language.

Aristotle wrote that "almost all things have been found out, but some have been forgotten,"²⁷ an adage demonstrated repeatedly in the profession of arms, where lessons paid in blood have been forgotten, or worse yet, neglected in peacetime, only to be rediscovered and paid for again in the next war. Desert Storm provided many valuable lessons; the benefits associated with a well focused and unified air plan; the effectiveness of a operational fires as a prelude to a major operation (ground offensive); and the importance of operating jointly, with open dialogue between components to assure maximum efficiency and unity of effort. The lessons will not soon be forgotten. Whether or not they will they be neglected is yet to be seen.

NOTES

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- ¹ Naval War College JMO Dept., Operational Art, (Newport, RI: Naval War College Press, Jan 1996), p. 6.
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- ³ Ibid., p. 7-8.
- ⁴ Ibid., p. 29.
- ⁵ Naval War College JMO Dept., p. 7.
- ⁶ Warden, John A. III, The Air Campaign, (Washington: Fort Lesley J. McNair, National Defense University Press, 1988), p. 89-90.
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- ⁹ Interview with Col. Tom Waller, U. S. Army, Student JMO Class, Naval War College, Newport, RI: 13 May 1996.
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- ¹¹ Howard, Michael and Peter Paret, eds. and trans., Carl Von Clausewitz: On War, Indexed ed. (Princeton, NJ: Princeton University Press, 1984), p. 348.
- ¹² U. S. Army Dept., Operations, FM 100-5 (Washington: 1993), p. 7-12 through 7-14.
- ¹³ U. S. Army Dept., FM 100-7, p. 2-21.
- ¹⁴ U. S. Army Dept., FM 100-7, p. 5-1.
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- ¹⁶ U. S. Air Force Dept., Basic Aerospace Doctrine of the United States Air Force, AFM 1-1 vol. 1, (Washington: U. S. Govt. Print. Off., 1992), p. 5.
- ¹⁷ Gordon and Trainor, p. 78.

¹⁸ Ibid., p. xv-xvi.

¹⁹ SOF forces are also called on to conduct operational fires in circumstances where the target is unreachable by other means or requires clandestine operations, but their share of the total will generally be minor.

²⁰ Joint Chiefs of Staff, Unified Action Armed Forces (UNAAF), JP 0-2, (n.p.: 24 February 1995), pp. IV-3 and IV-4; U. S. Air Force Dept., Plans and Operations Headquarters, USAF JFACC Primer, 2d ed. (Washington: 1994, p. 9.

²¹ Depending on the situation in the theater, however, the JFACC may not be able to devote the bulk of the air effort to attaining total aerospace control initially. If ground troops are heavily engaged or if sufficient air forces have not arrived yet the JFACC may have to satisfy himself with conducting defensive counter-air missions to cover the initial deployment of forces into the theater.

²² Gordon, and Trainor, p. 310. The Tactical Air Force controlled air strikes in South Viet Nam, the Strategic Air Command directed B-52 the operations, and the Navy directed its own effort from carriers in the China Sea.

²³ Ibid, p. 311.

²⁴ U. S. Air Force Dept. Plans and Operations Headquarters, p. 26.

²⁵ Ibid, p. 33-34.

²⁶ That person would track the current location of the FSCL/CEZ and the entry and exit times of aircraft operating within the CEZ. Operations requiring a particularly high operational tempo would benefit from the addition of "Killer Scouts" to sequence fighters into the CEZ and direct them to targets. Aircraft that arrived on the scene and found that the battle had advanced to the point where their target was within the CEZ could then be directed to proceed to their target if required, or proceed to a predefined "Kill box" within the CEZ to attack targets of opportunity. Aircraft would fly to their assigned "kill-box" via minimum risk routing and report established in their area. On departure aircraft would exit via the same minimum risk corridor and report clear of the area. With aircraft transiting in and out of "kill-boxes" every few minutes Army artillery units could be assured of having an opportunity to employ long-range weapons within minutes without compromising the safety of airmen. The air effort would also enjoy the increased access inherent in the "kill-box" concept. The "kill-box" and fast FAC concepts were proven effective in both Viet Nam and in Desert Storm.

²⁷ The Oxford Dictionary of Quotations, 3d ed. (Oxford: Oxford University Press, 1979), p. 12.

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